in experimental and small-lot production of instruments. No personalities are mentioned. There are 10 references, all Soviet.

TABLE OF CONTENTS:

1. RUDNEV YU.M.

2. USSR (600)

4. Sheet-metal Work

7. Graphic method for laying out work on sheet metal, Vest. mash 33 no. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, unclass.

RUDNEV, YU M

EPP.
.R92392

RUDNEV, YU M

LISTOVYYE SHTAMPY I KONDUKTORY DLYA ZAMENY SLESARNYKH RABOT. MOSKVA, MASHGIZ, 1955.

78 P. DIAGRS., TABLES.

BIBLIOGRAPHY: P. (77)

RUDNEV, Yu. N., Engineer

"Simplified Laminated Dies for Mechanizing Fitting Work"
Stanki I Instrument, 17, Nos. 4-5, 1946

BR-52059019

RUDNEV, Yuriy Mikhaylovich; SYTNIK, N.A., inzh., red.; GORDEYEVA, L.P., tekhn.red.

[Die stamping with the use of electromagnetic blocks] Shtampovka s primeneniem elektromagnitnykh blokov. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit.lit-ry, 1960. 57 p.

(MIRA 14:1)

(Sheet-metal work) (Electromagnets)

RUDNEV, Yu.M.

Experimental die stamping of thin instrument parts with an aluminum lower die. Kuz.-shtam. proizv. 2 no.8:46-47 Ag '60. (MIRA 14:2)
(Sheet-metal work) (Dies (Metalworking))

PUDOVIK, A.N.; KASHEVAROVA, E.I.; RUDNEV, Yu.P.

Phosphorus-containing esters of acrylic and methacrylic acids.
Dokl. AN SSSR 140 no.4:841-843 O '61. (MIRA 14:9)

1. Kazanskiy gosudarstvennyy universitet im. V.I.Ul'yanova-Lenina.
Predstavleno akademikom B.A.Arbuzovym.
(Phosphorus organic compounds) (Acrylic acid)
(Methacrylic acid)

L 42459-65 EWT(d)/T/EED-2/EWP(1) Pq-4/Pg-4/Pj-4/Pk-4 IJP(c) BB/GG

ACCESSION NR: AP5006639 S/0146/65/008/001/0082/0088

40
39
B

AUTHOR: Rudnev, Yu. P.

16

TITLE: Accumulator with amplitude digit-position-weight coding in a high-speed-carry circuit

SOURCE: IVUZ. Priborostroyeniye, v. 8, no. 1, 1965, 82-88

TOPIC TAGS: accumulator, digit position weight coding, coding, high speed carry

ABSTRACT: Use of amplitude coding in a high-speed-carry circuit, in a binary accumulator, for purposes of reducing the number of series-connected elements is considered. Conventionally, a special coding is used in the digit-position-weight system because the carry-circuit gates are connected in series which results in an accumulation of delays. This summation algorithm is offered: one of the binary numbers is transferred into the accumulator unchanged; the digits of

Card 1/2

L 42459-65

ACCESSION NR: AP5006639

the second number are transferred by direct or reverse code depending on the results of digit-place comparison of the summands. A given digit of the second number is sent to the accumulator by the direct code only in the case when the lower positions (a) do not contain two 1 and (b) contain two 1 and two 0 but one of the latter is higher than any place with two 1. This algorithm requires only one flip of the accumulator triggers. By using amplitude digit-weight coding and the above algorithm, the number of series-connected elements in the high-speed-carry circuit can be reduced by several times. Orig. art. has: 4 figures and 14 formulas.

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut (Moscow Engineering and Physics Institute)

SUBMITTED: 08Apr64 ENCL: 00 SUB CODE: DP

NO REF SOV: 001 OTHER: 000

Card 2/2

L 11175-67 EWT(d)/EWT(l)/EWP(l) IJP(c) TG/GG/BB
ACC NR: AP6024808 SOURCE CODE: UR/0378/66/000/003/0072/0077

35

AUTHOR: Rudnev, Yu. P.

ORG: none

TITLE: Estimation of the degree of improvement on reliability following use of correcting codes 16

SOURCE: Kibernetika, no. 3, 1966, 72-77

TOPIC TAGS: error correcting code, system reliability, computer reliability, information theory

ABSTRACT: A prerequisite for efficient coding is the matching of the code with the statistical characteristics of the channel. In other words, independent-error-correcting codes may not be used in systems operating in the burst mode, and vice versa. Therefore, independent-error-correcting codes must be used in the data storage and transmission systems of parallel-type digital electronic computers, which are characterized by independent errors. The problem of estimating the improvement in the principal quantitative characteristics of reliability is formulated as follows: Let there be a number m of digit positions with which the machine ope-

Card 1/2 UDC: 621.391.176

L 11175-67
ACC NR: AP6024808

rates, i.e. let there be a specific amount of information which must be encoded by the correcting code. Problem: estimate the degree of improvement in the reliability of the data storage and transmission systems of parallel-type computers for two different approaches to the utilization of systematic codes (n, k) :1) use of codes with a high correcting power in which the number of information bits k equals m; 2) use of short codes (n, k) which correct not more than one error. In case 2) the arrangement of bits is such that there exist c = m/k independent groups of bits each of which is coded by a code having the bit length n which makes it possible to correct not more than one error within the confines of the discrete group of bits. The chief characteristics of the reliability of redundancy systems are analyzed (probability of malfunction and mean operating time until the first malfunction) for both types of codes and it is demonstrated that the use of the short code assures a longer mean operating time until the first malfunction compared with the use of long codes so far as the data storage and transmission systems of parallel-type computers are concerned. Orig. art. has: 5 figures, 6 formulas, 1 table.

SUB CODE: 09, 12/ SUBM DATE: 14May65/ ORIG REF: 002/ OTH REF: 001

Card 2/2 nd

RUDNEV, Yu.P.

Computation of several categories of quotients as a possible method for rapid division on digital computers. Avtom.i prib. no.1:30-35 Ja-Mr '62. (MIRA 15:3)
(Electronic digital computers)

29016
S/020/61/140/004/017/023
B106/B110

15 8150

AUTHORS: Pudovik, A. N., Kashevarova, E. I., and Rudnev, Yu. P.

TITLE: Phosphorus-containing acrylic and methacrylic esters

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 4, 1961, 841-843

TEXT: Polymers and copolymers of acrylic and methacrylic esters containing sulfur, fluorine, tin, lead, silicon, mercury, etc. often have particular properties: high hardness and heat resistance, good adhesion to glass and metal, low permeability to X-rays, low combustibility, etc. In this connection, a method was developed for the synthesis of acrylic and methacrylic esters containing phosphorus in the alcohol component. Some properties of these esters were studied. The synthesis is based on the reaction of acid chlorides of acrylic and methacrylic acids with hydroxy-alkyl phosphinic esters (molar ratio 1 : 1) in ether solution in the presence of triethylamine. CuCl was used as inhibitor.

$$CH_2{=}CR{-}COCl + R'CHOH\underset{\underset{O}{\|}}{P}(OR'')_2 \longrightarrow CH_2{=}CR{-}COOCHR'{-}\underset{\underset{O}{\|}}{P}(OR'')_2$$

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S/020/61/140/004/017/023
B106/B110

Phosphorus-containing acrylic . . .

(R = H or CH_3; R' = H or CH_3; R" = CH_3, C_2H_5 . .) Reactions proceed smoothly in most cases, esters form with yields of 60-70%. The α-hydroxyalkyl phosphinic esters used as initial substances were prepared by reacting formaldehyde and acetaldehyde with dialkyl phosphorous acids in the presence of sodium alcoholate, acryl and methacryl chlorides were obtained from acids by reaction with phosphorus trichloride. The characteristics of the acrylic and methacrylic esters synthesized are shown in Table 1. All these compounds are easily soluble in methanol, ethanol, ether, acetone, benzene, and carbon tetrachloride. Moreover, esters containing methyl and ethyl radicals in the phosphono group are soluble in water. When the α-(dimethyl phosphono)-ethyl methacrylic ester is polymerized in the presence of 0.3 mole% benzoyl peroxide (9 hr at 80°C), a solid transparent polymer formed which swelled strongly in water, alcohol, benzene, acetone, and carbon tetrachloride. The polymer burns with sooty flame, but does not keep burning by itself. The polymer obtained by polymerization of α-(diethyl phosphono)-ethyl methacrylic ester in the presence of 0.5 mole% benzoyl peroxide (30 hr at 100°C) is a soft, transparent, plastic mass readily soluble in methanol, ethanol, and acetone. It is precipitated by petroleum ether from solutions in benzene

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29016

S/020/61/140/004/017/023
B106/B110

Phosphorus-containing acrylic

and acetone. Methyl methacrylate and α-(dimethyl phosphono)-ethyl methacrylic ester (weight ratio 83 : 17) were copolymerized at 75°C for 1.5 hr. The copolymer obtained is a transparent and solid product soluble in acetone and benzene. A white, solid, nontransparent product containing 2.2% phosphorus was obtained after reprecipitating by dissolution in acetone precipitating with petroleum ether, and subsequent drying in vacuo. This copolymer burns with sooty flame and keeps burning when the flame has been removed. There are 1 table and 16 references: 11 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: G. Sumrell, I. Briskin, G. Ham, C. S. Shramm, J. Am. Chem. Soc., 81, 4308 (1959); C. S. Marvell, W. S. Anderson, Ind. and Eng. Chem., 47, 344 (1955); A. Saiton, E. Rochow, J. Org. Chem., 23, 116 (1958).

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

PRESENTED: May 8, 1961, by B. A. Arbuzov, Academician

SUBMITTED: May 5, 1961

Card 3/6

Phosphorus-containing acrylic ...

Legend to Table 1: (1) Denominations; (2) yield, %; (3) boiling point, °C (pressure, mm); (4) found; (5) calculated; (6) phosphorus content, %; (7) dialkyl phosphono-methyl and dialkyl phosphono-ethyl acrylic esters; (8) dialkyl phosphono-methyl and dialkyl phosphono-ethyl methacrylic esters.

Card 4/6

RUDNEV, Yu.P.

Stabilized intermittent current-supply sources for semiconductor devices. Avtom.i prib. no.1:66-70 Ja-Mr '63. (MIRA 16:3)
(Voltage regulators) (Semiconductors)

RUDNEV, Yu V.

O povedenii beskonechno ubyvayushchikh integralov lineynogo uravneniya vtorogo poryadka pri bol'shikh znacheniyakh argumenta. M., Uchën. zap. un-ta, 15 (1939), 203-208.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

RUDNEV, Yu. V.

Rudnev, Yu. V. On certain motions of a gas with variable entropy and total energy. Doklady Akad. Nauk SSSR (N.S.) 59, 869–870 (1948). (Russian)

It is shown that the modified stream function associated with a certain restricted family of rotational flows obeys the same differential equation in the hodograph plane as does the (unmodified) stream function conventionally associated with isentropic flows. The author concludes that for each isentropic flow there exist rotational flows having the same streamlines. No specific examples are discussed.

G. F. Carrier (Providence, R. I.).

Source: Mathematical Reviews, Vol 9 No. p

ACC NR: AP6019618 (A,N) SOURCE CODE: UR/0048/66/030/002/0271/0277

AUTHOR: Borkin, I.M.; Guzhovskiy, B.Ya.; Rudnev, V.S.; Solodovnikov, A.P.; Trusillo, S.V.

ORG: none

TITLE: Excitation of isobaric analog states in Cu-59, Cu-61, Cu-62, Cu-63, and Cu-65 /Report, Fifteenth Annual Conference on Nuclear Spectroscopy and Nuclear Structure, held at Minsk, 25 January to 2 February 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 2, 1966, 271-277

TOPIC TAGS: nuclear reaction, inelastic scattering, proton reaction, proton scattering, nickel, copper, Coulomb interaction, ~~Coulomb energy~~

ABSTRACT: Excitation functions of the $Ni^A(p,n)Cu^A$ reactions for A = 60, 61, 62, and 64, and inelastic proton scattering cross sections of Ni^A for A = 58, 60, 62, and 64 were measured at incident proton energies up to 8 MeV in order to determine the Ni^A–Cu^A Coulomb energy differences. Targets of 0.2 mg/cm^2 of Ni on an Au substrate were employed for the (p,n) measurements for proton energies up to 6.2 MeV, and 2 mg/cm^2 Ni foils were used for the inelastic scattering measurements and for the (p,n) measurements at energies above 6.2 MeV. In the (p,n) measurements the neutron yield was determined at 0° and 90°, and the inelastic proton scattering cross sections were measured (in arbitrary units) at 90° and 160°. Resonances corresponding to

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ACC NR: AP6019618

excitation of analogous states were identified with the aid of the approximate value 9.45 MeV for the Ni-Cu Coulomb energy difference. For each mass number the Coulomb energy difference was determined from measurements of some ten resonances. The Ni^A-Cu^A Coulomb energy difference was found to be practically constant and equal to 9.226 MeV for A = 61, 63, and 65 and to be about 90 keV higher for A = 59 and 62. The 90 keV difference is much higher than the experimental errors, which are estimated at from 17 to 25 keV, and it is also higher than the 40 keV that the authors feel is the maximum that could be ascribed to shell effects. Orig. art. has: 1 formula, 8 figures, and 6 tables.

SUB CODE: 20 SUBM DATE: 00 ORIG. REF: 000 OTH REF: 008

Card 2/2 LC

TAGIROV, K.Kh. [deceased]; RUDNEVA, A.B.; MODEL', M.S.; DMITROVSKIY, Ye.B.

Minerals of the anosovite group. Trudy Inst.met.AN SSSR no.1:21-32 '57. (MIRA 10:11)

(Anosovite) (Slag)

RUDENKO, L.P.; RUDNEVA, A.G.

Results of sleep therapy of certain types of psychic disorders. Zhur.nevr. i psikh. 53 no.6:459-461 Je '53. (MLRA 6:6)

1. Stavropol'skaya psikhonevrologicheskaya bol'nitsa. (Sleep) (Psychoses)

RUDNEVA, A. S.

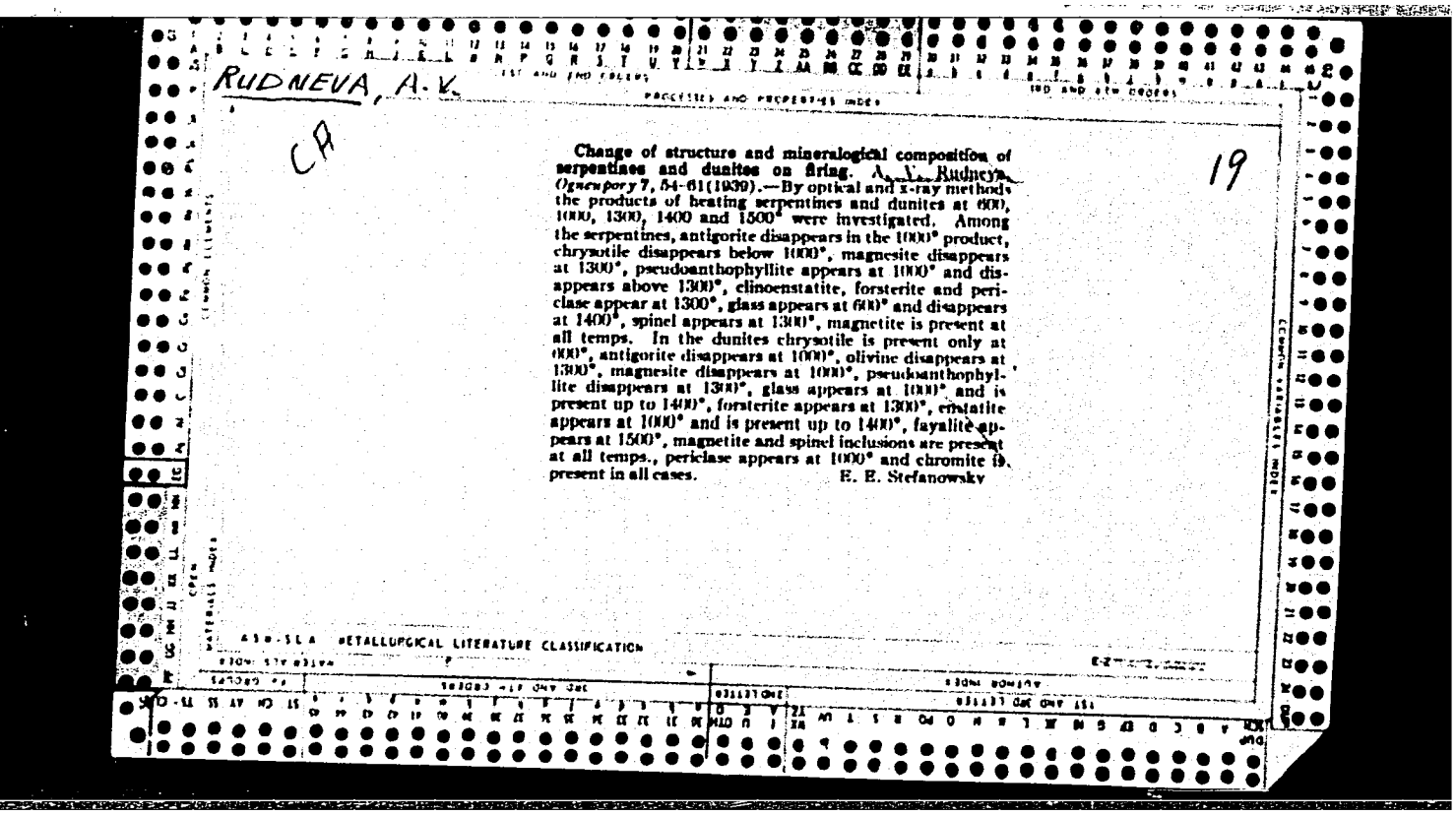
The Economic Efficacy of Various Methods in the Production of Rubber for Lower Parts of Shoes. Leka Promishlenost (Light Industry), #3:46: Mar 55

PUSHKIN, P.S., kandidat tekhnicheskikh nauk; RUDNEVA,A.S., inzhener.

Economic advantages of various methods used in the production of rubber parts of shoe bottoms. Leg.prom. 15 no.2:12-15 F '55.
(Shoe industry)
(MIRA 8:4)

RUDNEVA, A.V.

Glaze and its effect on railroad and automotive transport.
Trudy GGO no.161:23-27 '64. (MIRA 17:9)



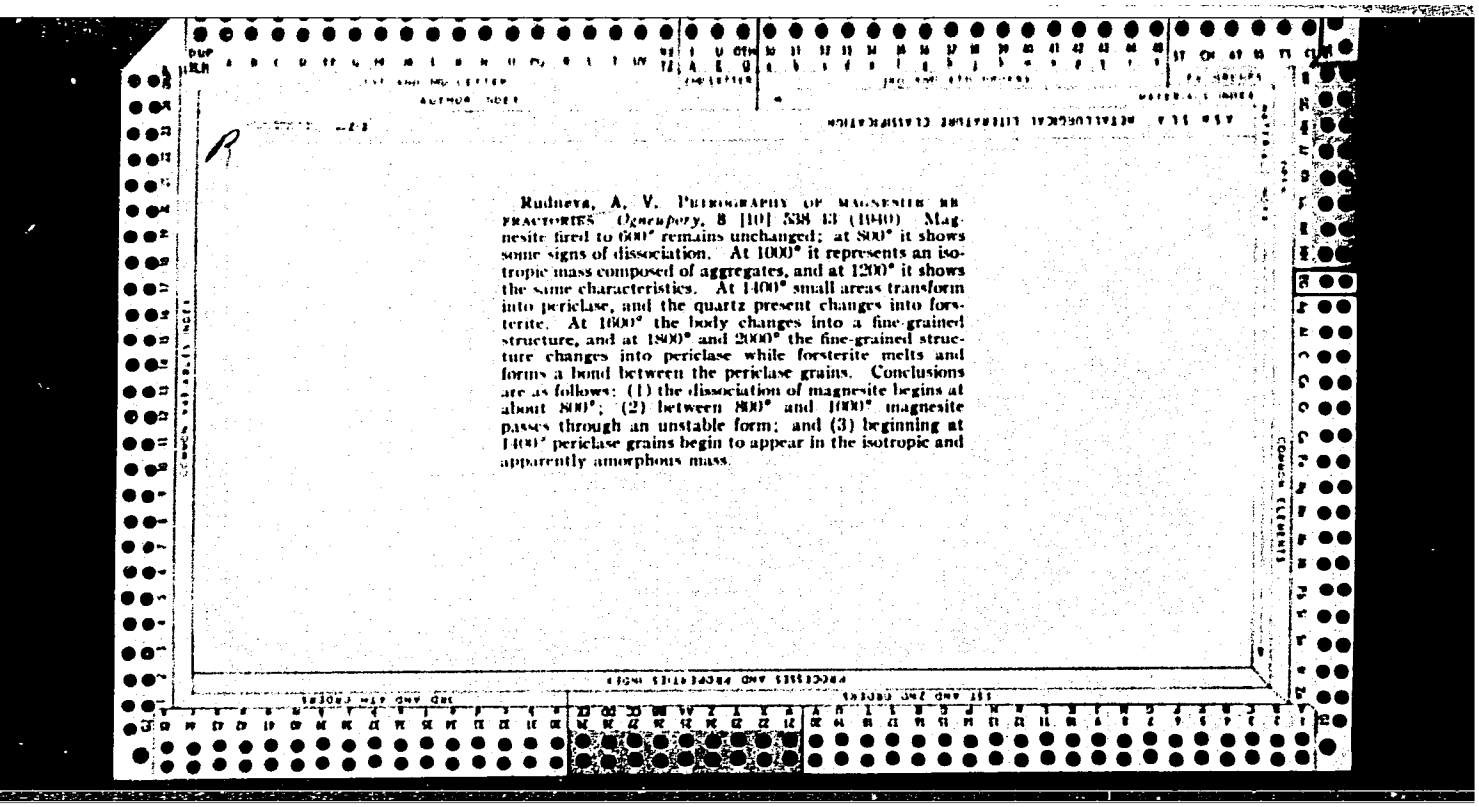
RUDNEVA, A. V.

CA

19

Change of structure and mineralogical composition of serpentines and dunites on firing. A. V. Rudneva. *Ogneupory* 7, 54-61 (1939).—By optical and x-ray methods the products of heating serpentines and dunites at 600, 1000, 1300, 1400 and 1500° were investigated. Among the serpentines, antigorite disappears in the 1000° product, chrysotile disappears below 1000°, magnesite disappears at 1300°, pseudoanthophyllite appears at 1000° and disappears above 1300°, clinoenstatite, forsterite and periclase appear at 1300°, glass appears at 600° and disappears at 1400°, spinel appears at 1300°, magnetite is present at all temps. In the dunites chrysotile is present only at 600°, antigorite disappears at 1000°, olivine disappears at 1300°, magnesite disappears at 1000°, pseudoanthophyllite disappears at 1300°, glass appears at 1000° and is present up to 1400°, forsterite appears at 1300°, enstatite appears at 1000° and is present up to 1400°, fayalite appears at 1500°, magnetite and spinel inclusions are present at all temps., periclase appears at 1000° and chromite is present in all cases. E. E. Stefanowsky

A34-51A METALLURGICAL LITERATURE CLASSIFICATION



Rudneva, A. V. PETROGRAPHY OF MAGNESITE REFRACTORIES. *Ogneupory*, 8 [10] 538-43 (1940). Magnesite fired to 600° remains unchanged; at 800° it shows some signs of dissociation. At 1000° it represents an isotropic mass composed of aggregates, and at 1200° it shows the same characteristics. At 1400° small areas transform into periclase, and the quartz present changes into forsterite. At 1600° the body changes into a fine-grained structure, and at 1800° and 2000° the fine-grained structure changes into periclase while forsterite melts and forms a bond between the periclase grains. Conclusions are as follows: (1) the dissociation of magnesite begins at about 800°; (2) between 800° and 1000° magnesite passes through an unstable form; and (3) beginning at 1400° periclase grains begin to appear in the isotropic and apparently amorphous mass.

RUDNEVA, A. V. Cand. Geolog-Mineral Sci.

Dissertation: "Sigangoy Deposits of Emery." All-Union Sci. Res. Inst. of Mineral Raw Materials. 17 Dec 47.

SO: Vechernyaya Moskva, Dec, 1947 (Project #17836)

BARDIN, Ivan Pavlovich, 1883- , akademik; TSYLEV, L.M.; RUDNEVA, A.V.; CHERNYSHEV, A.M.

[Viscosity and mineralogical composition of primary blast-furnace slag] Viazkost' i mineralogicheskii sostav pervichnykh domennykh shlakov. Moskva, Izd-vo Akademii nauk SSSR, 1951. 33 p. (MLRA 6:11)
(Slag)

USSR/Metals - Pig Iron, Processes Apr 52

"Changes in the Phase Composition of Molten Materials in the Processes of Slag Formation in Blast Furnaces," Acad I. P. Bardin, A. V. Rudneva, L. M. Tsylev

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 4, pp 532-559

Presents results of petrographic investigation of half-reduced ores, slags and agglomerates taken from various levels of blast furnace in process of making foundry pig iron. Concludes that optimum mineralogical compn of primary blast furnace slags must be characterized by predominance of Ca-Fe and

219T45

PUDNEVA, A.V.

Ca-Mn silicates with simple structure and by lowest possible content of those Ca silicates and aluminosilicates which increase slag viscosity and have higher mp. Illustrated by a series of micrographs.

(CA 47 no.4: 6846 '53)

219T45

RUDNEVA, A. V.

J. of the Iron & Steel Inst.
V-176 Feb 1954
Treatment & Use of Slags

The Mechanism of the Viscosity of Blast-Furnace Slags. A. M. Chernyshev, L. M. Tsylov, and A. V. Rudneva. (*Izvestiya Akademii Nauk S.S.S.R., Otdelenie Tekhnicheskikh Nauk*, 1953, (7), 1044–1057). [In Russian]. On the basis of the ionic theory of slags a theoretical interpretation of changes in the viscosity of slags with changes in their chemical composition is attempted. It is concluded that the viscosity of a homogenous liquid slag is governed mainly by the size of silicate anions : The greater the size of silicate anions and the concentration of large silicate aggregates, the stronger is the interlocking of the individual slag layers. The size of the complex silicate anions depends on the ratio of the number of oxygen atoms to the number of silicon atoms in the slag. The larger this ratio is, the smaller are the silicate aggregates and *vice versa*. Therefore, with increasing concentration in the slag of CaO, MgO, TiO_2, MnO, FeO, and Na_2O, *i.e.*, oxides which do not form complex aggregates in a liquid slag, the viscosity of the slag is decreased because of the increase in the oxygen/silicon ratio.—v. g.

Chem. Abst.
Vol. 48, No. 4
Feb 25, 1954

USSR/Engineering - Metallurgy FD-2749

Card 1/1 Pub 41 - 10/16

Author : Bardin, I. P., Rudneva, A. V., Tsylev, L. M., Moscow

Title : Smelting phases in a blast furnace

Periodical : Izv. AN SSSR, Otd. Tekh. Nauk 5, 123-128, May 1955

Abstract : Deals with temperature ranges within the blast furnace and the solid-plastic-liquid stages of the charge. The point of slag formation is emphasized in relation to the plastic stage, as it is through control of the thickness of this stage, the author claims that heat transmission to the solid stage is effected, and thus also the efficiency of the blast furnace. The author claims it is most desirable to maintain a thin plastic stage for better efficiency, especially with the building of 1300 M3 blast furnaces now going on in the USSR. Illustrations.

Institution :

Submitted : March 12, 1955

RUDNEVA, A.V.

Genesis of the emery deposits of Sigangolsk (Shirinsk district, Krashoyarsk territory). A. V. Rudneva. *Zapiski Vsesoyuz. Mineral. Obshchestva* 85, 650-62(1956).—The described emery occurrence forms xenolithic inclusions of highly aluminous rocks which have the type of original bauxites. They occur amidst gabbroidal and augite-granosyenitic intrusions of the Mt. Lysaya massive. The genesis of corundum in such rocks is typically contact-metamorphic under the thermal action of these intrusions. The metamorphic origin in such types is very important for the future systematic prospecting for metamorphic bauxites, especially in adjacent Cambrian sediments which, however, often do not show such a high degree of metamorphic changes since no intrusions have acted on the bauxites. The whole area of the inner contact zone of the basic intrusions with interposed Cambrian horizons is therefore also interesting for exploring new emery deposits of the type of those of Sigangolsk. The mineral assocn. of the emery is usually with magnetite up to 50-80%, titanomagnetite and ilmenite, further with sillimanite (15-60%), plagioclase (usually andesine-labradorite with 10 to 45%), less with spinel or brown micas. The corundum content of the emeries varies between 2 and 70-80%, the usual ore having 10-40%. The intimately assocd. sillimanite indicates siliceous portions of the original bauxite deposits. The plagioclase forms a nearly monomineralic plagioclasite rock in the relatively thin contact zone immediately between the emery and the gabbroidal rock. Locally, the corundum is changed to sericite which even may form regular pseudomorphs after corundum. Chem. analyses and mineral computations are given for six typical emery

W. Hitel

RUDNEVA, A.V.

137-1957-12-23062

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 28 (USSR)

AUTHORS: Tagirov, K. Kh., Rudneva, A. V., Reznichenko, V. A.

TITLE: Physical and Chemical Transformations During the Sintering of Titanomagnetite (Fiziko-khimicheskiye prevrashcheniya pri aglomeratsii titanomagnetitov)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 1, pp 3-7

ABSTRACT: The titanomagnetite concentrate subjected to sintering is a fine-crystalline titanomagnetite (TM) having the structure of a decomposed solid solution conducive to the formation of thin growths of ilmenite and magnetite. The impurities of the TM comprise Plagioclase, pyroxene, hornblende, and biotite. It has been established that during sintering the fine-crystalline TM's undergo a complete recrystallization and form a sinter (S) with a crystalline grain structure. The titanomagnetite ilmenite is not destroyed during sintering; a considerable amount of hematite dissolves in it and forms a new phase, namely, a solid solution of hematite in ilmenite. The formation of the solid solution in S is accompanied by the partial decomposition of

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137-1957-12-23062

Physical and Chemical Transformations (cont.)

the magnetite in the presence of a liquid silicate phase, namely, glass. The formation of anosovite and of metallic Fe points to the existence of restoration processes in sintering, processes which are most active in the regions of the charge which are protected from the oxidizing influence of the O_2 of the air. The formation of pseudobrookite and hematite points to the existence of oxidizing conditions, particularly in the final stage of sintering.

A. Sh.

1. Minerals-Transformations 2. Sintering-Applications

Card 2/2

RUDNEVA, A.V.

137-1958-2-2342

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 2, p 19 (USSR)

AUTHORS: Tagirov, K.Kh., Rudneva, A.V., Model', M.S., Dmitrovskiy, Ye.B.

TITLE: Minerals of the "Anosovit" Group (Mineraly gruppy anosovita)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 1, pp 21-32

ABSTRACT: An account is given of the optical and X-ray characteristics of minerals of the "anosovit" group. These minerals were identified from a study of the crystallization products of reducing fusions of the systems $CaO-TiO_2$ (with 14% CaO and 86% TiO_2), $CaO-MgO-TiO_2$ (with 11-15% CaO, 73-75% TiO_2, and 4-16% MgO), $MgO-TiO_2$ (with 18% MgO and 82% TiO_2), and $Al_2O_3-TiO_2$ (with 20% Al_2O_3 and 80% TiO_2). In the series of high-titanium slags investigated, five varieties of mineral belonging to the anosovit group were identified: 1) Ti^{3+} anosovit - with Ti^{3+} predominating; 2) Ti^{4+} anosovit - with Ti^{4+} predominating; 3) magnesium anosovit - with Mg in solid solution; 4) aluminum anosovit - with Al in solid solution; 5) ferruginous anosovit - with iron in solid solution. A detailed examination of the slags of the $CaO-MgO-TiO_2$ type (with an MgO concentration in the anosovit

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Minerals of the "Anosovit" Group

ranging from 4 to 18%) revealed the presence of a continuous series of solid solutions between the compounds $MgO \cdot 2TiO_2$ and Ti_3O_5 (anosovit). An account is given, also, of the conditions of formation and of the optical properties of such artificial minerals as orthotitanate of magnesia, $2MgO \cdot TiO_2$, and the crystalline sesquioxide of titanium (Ti_2O_3) which are often concomitant phases of high-titanium "anosovit" slags. A study of the conditions of formation of $2MgO \cdot TiO_2$ led to the conclusion that it is desirable to limit the quantity of Mg introduced into slag melts. The introduction of MgO is useful only so long as a magnesium-anosovit compound more easily fusible than Ti^{3+} anosovit is forming; the MgO becomes detrimental when its surplus combines with the higher oxides of Ti to form a fusion-resistant orthotitanate of Mg with a melting temperature of 1830°. The identification of mixed crystals with a structure Ti_3O_5, as enumerated above - - having different concentrations of Ti^{3+}, Mg and Al - - confirmed the correctness of existing concepts concerning the structure of minerals belonging to the anosovit groups and concerning the continuous series of solid solutions based on the Ti_3O_5 structure. The article includes photomicrographs of

Card 2/3

137-1958-2-2342

Minerals of the "Anosovit" Group

minerals of the anosovit groups and tables of interfacet distances for all the mineral phases discovered in the investigated slags. Bibliography 12 references. A.R.

1. Minerals--Optical characteristics 2. Minerals--X-ray characteristics

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RUDNEVA, A.V.

A study of viscosity of primary blast-furnace slag. N. L. Zhilo, A. V. Rudneva, G. A. Sokolov, and L. M. Tsylev. *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1957, No. 2, 27–35; cf. *C.A.* 50, 3172*h*.—The effect of alkalies and of FeO in the presence of alkali upon the viscosity of the primary blast-furnace slags was investigated. K_2O lowered the viscosity and the crystn. temp. of the acid and basic Al_2O_3-free slag. In slags contg. 5–10% Al_2O_3 higher K_2O lowered the viscosity and the crystn. temp. of the acid slags only, and had the opposite effect upon the basic slags. The optimum slag compn. with up to 5% Al_2O_3, with respect to fluidity, was CaO 35–52, SiO_2 42–8, and K_2O 0 to 17%. FeO lowered the viscosity and the slag initial crystn. temp. more strongly in acid than in basic slags. The addn. of 3–10% alkali lowered the slag viscosity with the CaO-SiO_2 ratio between 0.81 and 1.18. The alkali in the slag displaced the FeO in the fused slag, and in this way speeded up the Fe reduction. —W. M. Sternberg

RUDNEVA, A V.

AUTHORS: Polyakov, A. Yu. and Rudneva, A.V. (Moscow).

TITLE: Investigation of transformed vanadium slags. (Issledovaniye peredel'nykh vanadiyevykh shlakov). 24-4-7/34

PERIODICAL: "Izv. Ak. Nauk, Otd. Tekh. Nauk" (Bulletin of the Ac. Sc., Technical Sciences Section), 1957, No.4, pp.45-53 (USSR).

ABSTRACT: Belyankin, D. S. and Lapin, V. V. (1) and Umanskiy, Ya.S. et alii (2) established that most of the vanadium present in such slags is contained in a vanadium spinelide, the composition of which is complicated by presence in it of three-charge cathions of Cr, Al and Ti; these cathions substitute isomorphically the ions of vanadium and of the trivalent iron on entering into the lattice of the vanadium spinel. A characteristic feature of the spinelide is its very low solubility in the silicate melt which increases slowly with increasing temperature. The distribution of the vanadium between the spinelide and the alumina containing phases influences the technical and economic indices of vanadium separation from the slags during their chemical processing. Therefore, the authors of this paper considered it of theoretical and practical interest to study the nature of transformed vanadium slags within a wide range of changes in their composition. For the investigations six specimens of slags obtained from experimental blowing of vanadium cast irons produced by the Chusovsk Works and of two specimens obtained in

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Investigation of transformed vanadium slags. (Cont.) 24-4-7/34

experimental blowing of vanadium iron produced from a concentrate of titano-magnetites. The chemical compositions of the investigated slags are given in Table 1, p.45. The main vanadium containing phase (vanadium spinelide) was separated from chemically analysed vanadium slags, according to the technique described by Belyankin (1) which was then subjected to a complete analysis. The chemical analyses were supervised by A. I. Ponomarev. For all the investigated slags the quantitative mineralogical composition was determined whereby the difference of the data of two calculations usually did not exceed 1 to 2%. The phase composition of vanadium slags was established by mineralogical and X-ray structural tests. Within the investigated compositions (9.92 to 25.75% V_2O_3, 12.25 to 30.40% SiO_2, 0.67 to 21.35% Cr_2O_3) only the vanadium spinelide contains vanadium in the crystalline phase. This conclusion is in full agreement with the results of chemical analyses according to which an extremely low V_2O_3 content in the silicate phases, amounting to 1 - 1.5%, is maintained constant at very low, 12%, as well as very high 30%, of silica in the slag. Thus, the investigated high vanadium low silica content slags have no advantage from the point of view of distribution of the vanadium between the phases compared with low vanadium content

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slags containing high percentages of silica. The vanadium spinelide is characterised by a high degree of constancy of the total content of "one-and-a-half" oxides. It is, therefore, advisable to reduce to a minimum the content of elements in vanadium irons which form in the slags oxides of the type R_2O_3. Vanadium slags which do not contain "one-and-a-half" oxides can be considered as being better substitutes for normal high vanadium content ores. There are 4 graphs, 3 microphotos, 8 tables and 4 Russian references.

Card 3/3

SUBMITTED: August 4, 1956.

AVAILABLE:

24-6-7/24

AUTHORS: Zhilo, N. L., Rudneva, A.V. and Sokolov, G.A. (Moscow).

TITLE: A comparison of the physico-chemical properties of primary slags in blast furnaces with their mineralogical composition. (Sopostavleniye fiziko-khimicheskikh svoystv pervichnykh domennykh shlakov s ikh mineralogicheskim sostavom).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac. Sc., Technical Sciences Section), 1957, No.6, pp.37-42 (U.S.S.R.)

ABSTRACT: In this paper data are given on the phase composition and a comparison is made of the real and the specified mineralogical composition of primary blast furnace slags of cast and open hearth pig iron with their physical properties. The aim of the here described investigations was to establish the reason for the differing behaviour of K_2O in acidic and basic slags in blast furnaces. The results of investigation of the viscosity of the studied slags were described in detail in earlier work of these authors "On investigating the viscosity of primary blast furnace slags" (same journal, 1957, No.2, pp.27-35). A comparison of viscosity, temperature of crystallisation, and the phase composition of primary slags in blast furnaces has led to a clarification of the adverse effect of alkalis on the physical properties of basic slags

A comparison of the physico-chemical properties of primary slags in blast furnaces with their mineralogical composition. (Cont.)

in blast furnaces. The latter is explained by the formation, in the molten slag, of high temperature alkali aluminium silicates having a volume skeleton structure of anion complexes (of the type of $K_2O.Al_2O_3.2SiO_2$). The alkali aluminium silicates and alkali silicates which are formed in acidic slags have lower melting points (750 C for calcium silicates; 1170 C for orthoclase). This explains the decrease in viscosity and temperature of crystallisation when alkalis are added to acidic blast furnace slags. The formation of fusible alkali silicates, dissociating at low temperatures, can explain the decrease in viscosity and temperature of crystallisation of both acidic and basic slags in blast furnaces, in the absence of alumina. The characteristic mineralogical combinations of the real phase state of the slags, in the range which is optimal from the point of view of easy fusibility and high fluidity, indicate that these are near to the eutectic range of the studied multi-component system. There are 7 figures, 1 table and 2 Slavic references.

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SUBMITTED: July 28, 1956.
AVAILABLE:

RUDNEVA, A.V.

20-1-38/54

AUTHOR RUDNEVA, A.V., MODEL', M.S., and MALYSHEVA, T.Ya.

TITLE New Types of Solid Solutions in High Titanium Slags (Novyye vidy tverdykh rastvorov v vysokotitanovykh shlakakh. Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 115, Nr 1, pp 141 - 144(U.S.S.R.)

ABSTRACT The microstructure and the phase composition of these slags often were objects of investigations both in this country and abroad. But the problems of mineral formation in multicomponent systems, as these slags are, have hitherto not been sufficiently well investigated. The phase composition of the slag varies considerably according to conditions of crystallization, chemical composition, temperature, and melting regime. By earlier investigations in the institute (see below) a number of new solid solutions was discovered beside the arosovite group (Ti_3O_5) namely solid solutions on the basis of magnesiumorthotitanate, ilmenite and Ti_2O_3. The former two were discovered by the authors in silicate-titanium-slags. Under the microscope the solid solutions $2(Mg, Fe)O \cdot TiO_2$ are represented by idiomorphic opaque, optically isotropic crystals of cubical appearance. They differ from magnesiumorthotitanate by a yelloish-brown nuance in reflected light. It may be assumed that these crystals belong to a new type of solid solutions between $2MgO / TiO_2$ and $2FeO \cdot TiO_2$. Solid solutions on an ilmenite basis were detected by the authors in the system

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New Types of Solid Solutions in High Titanium Slags

TiO_2-Ti_2O_3-FeO-SiO_2 in the region of high content of titanium oxide. In reflected light they are brownish-gray with a noticeable pleochroism of reflection from brownish-gray to pink-gray. In the case of crossed Nicols a marked anisotropic effect manifests itself. In permeating light they are completely opaque. X-ray investigations confirm the assumption that this phase represents a solid solution of TiO_2 in ilmenite. As a result of the investigations new series of solid solutions of unlimited miscibility were discovered and studied: 1.) 2FeO . TiO_2 and 2.) Fe, Mg, Mn) . TiO_2 - Ti_2O_3. The investigation carried out showed that besides previously discovered and described solid solutions with an anosovite structure Ti_3O_5 the newly-discovered mixed crystals play a very important part in the phases of high-titanium slags. It has to be added that the most widely spread silicate phase of high-titanium slags - titanium augite - also represents a solid solution of complex composition. It is built according to the type of the chain structure of the anion radical $(Si, Al)_2O_6$. (With 3 illustrations, 3 tables, 7 Slavic references).

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20-1-38/54

New Types of Solid Solutions in High Titanium Slags

ASSOCIATION: Institute for Metallurgy "A.A. BAIKOV" of the Academy of Sciences of the U.S.S.R. (Institut metallurgii im. A.A. Baykova Akademii Nauk SSSR),
PRESENTED BY: BARDIN, I.P., Member of the Academy, October 1, 1956.
SUBMITTED: 27.9.1956
AVAILABLE: Library of Congress

Card 3/3

20-4-44/60

AUTHORS Rudneva, A.V. and Malysheva, T.Ya.

TITLE On the Composition of Minerals of the Anosovite Group. (O sostave mineralov gruppy anosovita.)

PERIODICAL Doklady Akademii nauk SSSR, 1957, Vol. 115, Nr 4, pp. 787-790 (USSR)

ABSTRACT The main mineral phase of the high-titanium slag - anosovite - was several times mineralogically, X-ray structurally and chemically investigated. By X-ray structure it was determined that the minerals of this group form an isomorphous series of solid solutions on the structural basis of titanium oxide T_3O_5. This requires considerable variability of the composition with regard to the titanium content and various degrees of oxidation, as well as to the content of various components of the isomorphous series of 2- and 3-charge iron, magnesium and aluminum. As a result of earlier works concerning the synthesis and optical investigation of this group of minerals 5 varieties were determined:
1) titanum-3-anosovite, in which 3-charge titanium is predominant,
2) titanium-4-anosovite, where 4-charge titanium is predominant,

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On the Composition of Minerals of the Anosovite Group.

3) magnesium anosovite with a content of Mg in the solid solution,
4) aluminum anosovite with Al and 5 iron containing anosovite with Fe in the solid solution. The existence of these varieties indicates the possibility of further concentration limits of sesquioxides of Ti, Mg, Al and Fe in anosovite. If one starts from this, a general formula of the anosovite group may be represented in the following way:

$$m\,[(Ti, Al, Fe)_2O_3 \cdot TiO_2]\; n\,[(Ti, Mg, Fe)\,0.2TiO_2].$$

When, however, in the investigation of two- and three-component systems with titanium the existence of anosovite varieties of a specific chemical composition was proved, the problem of the minerals of the multicomponent group proved to be much more complicated in the case that Al-, Mg-, Mn- and Fe-oxides were simultaneously present. All these are elements capable of replacing the 2- and 3-charge titanium in the anosovite lattice. The authors worked out a chemical separation method of the mineral phases of high-titanium slags. The performed investigation made it possible to reveal, besides a precise

On the Composition of Minerals of the Anosovite Group.

determination of the chemical composition of anosovite, the component distribution between the mineral phases of the slag. The obtained data do not permit, however, to draw any conclusions on the character of distribution between anosovite and the glass of components such as MgO, Fe_2O_3 and MnO, except the fact that they simultaneously occur in both phases of the slag. A very small Al_2O_3-content in glass (2,0 and 0,6 %, see tab.1) is in contrast with the composition of the more completely crystallized factory slags. The assumption rises that the glassy structure of the investigated factory slags may characterize just those cases, since the entire aluminum of the slag virtually completely enters the anosovite lattice. The presence of 8,2 % TiO_2 and up to 4,4 % Ti_2O_3 indicates that a certain amount of the anosovite component probably exists in the glass in a dissolved state. The incompleteness of the separation of anosovite crystals may be explained by a very fast slag cooling under the factory conditions.

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20-4-44/60

On the Composition of Minerals of the Anosovite Group.

There are 1 figure, 2 tables and 8 Slavic references.

ASSOCIATION: None given.
PRESENTED: By I.P. Bardin, Academician, April 11, 1957
SUBMITTED: September 27, 1956.
AVAILABLE: Library of Congress.

CARD 4/4

RUDNEVA, A. V.

"New Minerals in Titanium Slags" p. 285

~~"Synthesis and Structure of [illegible] Slags and Complex Heavy Metal Cations " p. [illegible]~~

Transactions of the Fifth Conference on Experimental and Applied Mineralogy and Petrography, Trudy ... Moscow, Izd-vo AN SSSR, 1958, 516pp

reprints of reports presented at conf. held in Leningrad, 26-31 Mar 1956. The purpose of the conf. was to exchange information and coordinate the activities in the fields of experimental and applied mineralogy and petrography, and to stress the increasing complexity of practical problems.

18(0) PHASE I BOOK EXPLOITATION SOV/1728

Akademiya nauk SSSR. Institut metallurgii

Sovremennyye problemy metallurgii (Modern Problems in Metallurgy) Moscow, Izd-vo AN SSSR, 1958. 640 p. 3,000 copies printed.

Resp. Ed.: A.M. Samarin, Corresponding Member, USSR Academy of Sciences; Eds. of Publishing House: V.S. Nakhmankov, and A.N. Parnov; Tech. Ed.: T.V. Polynkova.

PURPOSE: This book is intended for scientific and technical personnel in the field of metallurgy.

COVERAGE: This is a collection of articles on certain aspects of Soviet metallurgy. The book is dedicated to Academician Ivan Pavlovich Bardin on the occasion of his 75th birthday. The book is divided into seven parts. The first part consists of two articles presenting a brief account of the biography and professional activity of the Soviet metallurgist. It includes an article by John Chipman, Nicholas Grant, and John Elliott (M.I.T., USA) describing their meeting with Bardin in Moscow and also his visit to the United States. The second part consists of three articles and deals with raw materials and fuels for the major metallurgical industry. The third part represents the major portion of the book. It consists of 25 articles dealing with the various aspects of the metallurgy of pig iron and steel. The fourth part consists of two articles treating the metallurgy of nonferrous metals. The fifth part consists of three articles on the forming of metals. The sixth part consists of eight articles discussing certain aspects of physical metallurgy. The last part deals with general problems in the field of metallurgy. References are given after each article. No personalities are mentioned.

TABLE OF CONTENTS:

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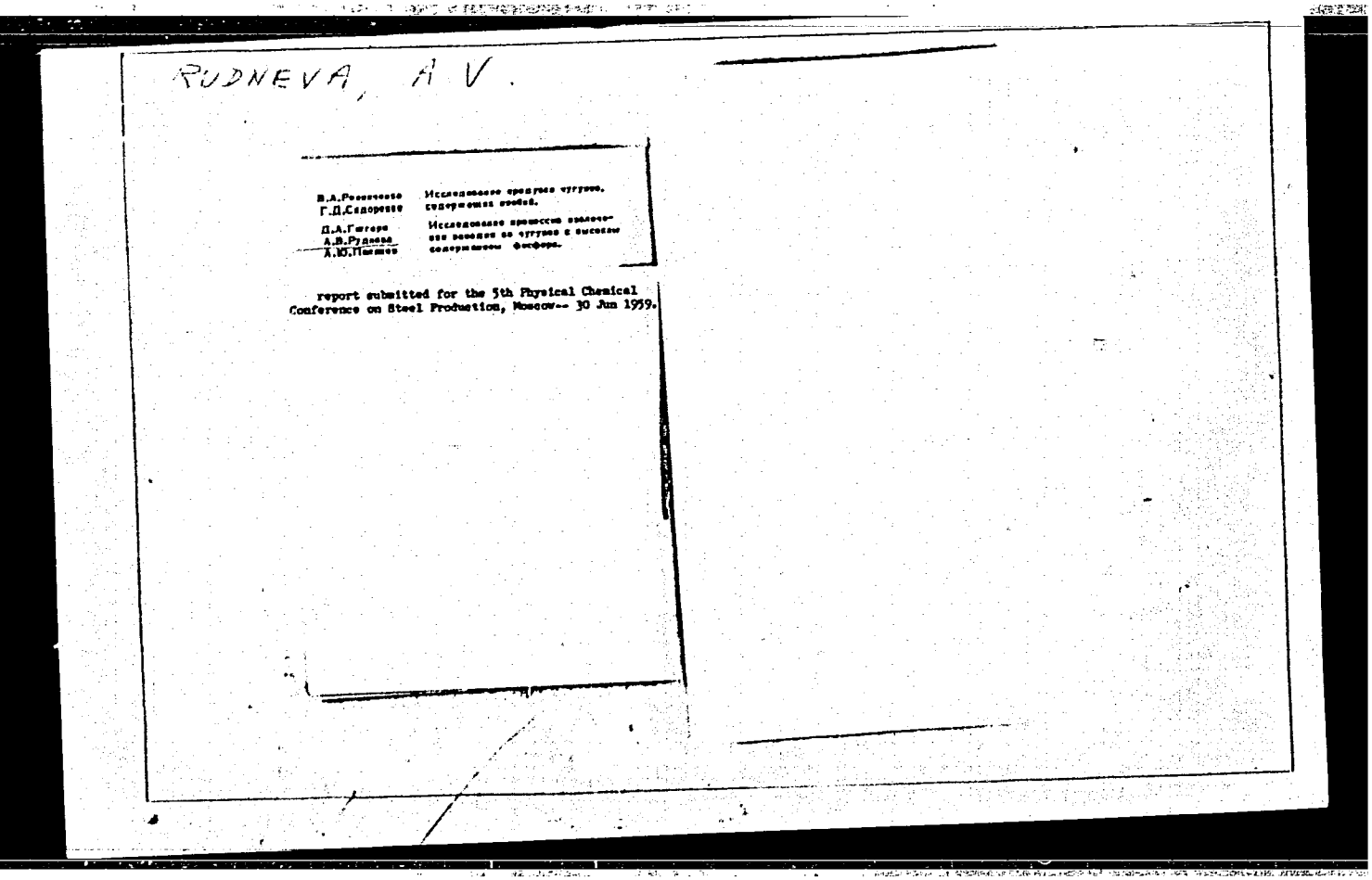
RUDNEVA, A.V.; ZHILO, N.L.; SOKOLOV, G.A.

Effect of phase constitution on the physical properties of blast furnace slag. Trudy Inst.met. no.3:52-62 '58. (MIRA 12:3)
(Slag--Testing) (Phase rule and equilibrium)

ZHILO, N.L.; SOKOLOV, G.V.; RUDNEVA, A.V.

Calculating the activation energy of viscous flow in connection with studies on physical properties of molten slags. Trudy Inst.met. no.3: 87-97 '58. (MIRA 12:3)
(Viscosity) (Chemical reaction, Rate of) (Slag--Testing)



RUDNEVA, A V.

В.А.Рожковская
Г.Д.Седорцева
Исследование структуры чугунов, содержащих ниобий.

Д.А.Гаттеров
А.В.Руднева
А.Ю.Пигалев
Исследование процессов выплавки ниобиевых чугунов с высоким содержанием фосфора.

report submitted for the 5th Physical Chemical Conference on Steel Production, Moscow-- 30 Jun 1959.

RUDNEVA, A.V.

"Phase Transformations in the Production of Ferroalloys."

Blast Furnace Production of Ferroalloys With Oxygen-enriched Blast, Moscow, 1959.

RUDNEVA, A.V.

(Institute of Metallurgy, Academy of Sciences USSR). Phase Composition of Niobium Slags, p. 41. Titan i yego splavy. vyp. II: Metallurgiya titana (Titanium and Its Alloys. No. 2: Metallurgy of Titanium) Moscow, Izd-vo AN SSSR, 1959. 179 p.

This collection of papers deals with sources of titanium; production of titanium dioxide, metallic titanium, and titanium sheet; slag composition; determination of titanium content in slags; and other related matters. The sources of titanium discussed are the complex sillimanite ores of the Kyakhtinskoye Deposit (Buryatskaya ASSR) and certain aluminum ores of Eastern Siberia. One paper explains the advantages of using ilmenite titanium slags for the production of titanium dioxide by the sulfuric acid method. Production of metallic titanium by thermal reduction processes (hydrogen, magnesium, and carbon reduction) is the subject of several papers, while other papers are concerned with the electrolytic production of titanium. Other subjects dealt with are interaction of titanium with water vapor and with hydrogen and the determination of titanium in slags.

SOV/180-59-1-7/29

AUTHORS: Ostroukhov, M.Ya., Rudneva, A.V. and Tsylev, L.M. (Moscow)

TITLE: The State of Slag-Forming Materials in the Blast Furnace Oxidizing Zone (O sostoyanii shlakoobrazuyushchikh materialov v okislitel'noy zone domennoy pechi)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 37-43 (USSR)

ABSTRACT: The authors point out that most of the comparatively few investigations (Refs 1-6) in which samples of liquids were taken from the blast-furnace hearth relate to furnaces working without raceways in front of the tuyeres. They describe their own investigation which had the aim of studying the behaviour of slag-forming materials under the conditions of present operation, characterised by raceways with their associated strongly oxidizing zones. The work was carried out at the imeni Dzerzhinskogo (Dzerzhinskiy) works with the participation of A.A. Krivosheyev and I.G. Polovchenko of the Central Works Laboratory. The furnace on which the trials were carried out had a hearth diameter of 8.2 m and sixteen 180 mm diameter tuyeres. The burden consisted of 30% raw Krivoy-Rog ore (grades 25 and 34) and 70% fluxed sinter of two basicities (0.25 and

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The State of Slag-Forming Materials in the Blast-Furnace Oxidizing Zone

0.5-0.55), the first containing some manganese. The blast temperature and volume were 450-600°C and 3000-3300 m^3/min, respectively. Pig-iron containing 0.4-0.7% Si, 1.7-2.5% Mn, 0.01-0.05% S, 0.08-0.1% P was smelted with a slag basicity ($CaO : SiO_2$) of 1.15 - 1.25. At times furnace working was uneven. Gas and material samples were taken at 200 mm intervals along a hearth radius with a 60 mm diameter water-cooled tube. The materials solidifying in the tube were drilled out, separated from pig-iron nodules and the portions corresponding to given sampling points were mixed. Larger (50-100 g) samples were subjected to complete chemical analysis, smaller ones were analysed for metallic iron, FeO and Fe_2O_3. The results of gas sampling are given in Fig 1, which shows composition against distance (mm) from nose of tuyere: the oxygen content falls to 2% at a distance of 1450 mm, CO_2 disappears at 1600 mm and the $O_2 : N_2$ ratio falls over the first 800 mm and then rises. The iron-oxide content of the slag-forming materials and the iron content of the oxides are shown in Fig 2 as functions of distance. A high $CaO : SiO_2$ ratio was found in the oxidizing zone, indicating that coke ash

The State of Slag-Forming Materials in the Blast Furnace Oxidizing Zone

does not participate in slag formation there. The manganese content of iron samples taken from the oxidizing zone is below that of the pig iron (Fig 3 shows manganese content against distance from the nose of the tuyeres). A detailed petrological examination of samples (Figs 4-9) indicated that part of the slag-forming materials are in the solid or plastic states in the oxidizing zone, consisting of sintered particles of iron oxide, lime and reoxidized iron sponge as well as droplets of iron and slag frozen by the blast. Sintering processes in the oxidizing zone lead to the formation of high-calcium silicates and calcium ferrites; recrystallisation of materials occurs in the plastic state directly at contact surfaces, but in the interval 1000-1300 mm from the tuyeres melting occurs. A minor part of the materials entering the oxidizing zone in the solid or plastic states

The State of Slag-Forming Materials in the Blast-Furnace Oxidizing Zone

is not affected appreciably.
There are 9 figures, 3 tables and 9 references, 4 of which are Soviet, 3 German and 2 English.

SUBMITTED: June 6, 1958

Card 4/4

SOV/180-59-2-1/34

AUTHORS: Gul'tyay, I.I., Zhilo, N.L., Rudneva, A.V., Sokolov, G.A. and Tsylev, L.M. (Moscow)

TITLE: Influence of Potassium Oxide on the Viscosity of Melts of the System Lime-Alumina-Silica in the Range Corresponding to the Compositions of Primary Blast-Furnace Slags (Vliyaniye okisi kaliya na vyazkost' rasplavov sistemy izvest'-glinozem-kremnezem v oblasti, sootvetstvuyushchey sostavam pervichnykh domennykh shlakov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, Metallurgiya i Toplivo, 1959, Nr 2, pp 3-7 (USSR)

ABSTRACT: Analyses of real blast-furnace primary slags (Ref 1) show an appreciable alkali content. The effect of alkalies on the physical properties of slags with 0.5 and 10% alumina has been described by some of the authors (Refs 1,2); the present work relates to melts with about 16% alumina. The experimental method used was as previously described (Refs 2,3), the apparatus (Ref 4) being slightly modified to increase thermocouple-sheath life. The range of compositions covered was: 10.8 - 42.7% CaO; 34.1 - 55.8% SiO_2; 15.0 - 17.5% Al_2O_3; 0.0 - 23.2% K_2O; 0.21 - 1.35 CaO/SiO_2. Table 1 shows the compositions

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Influence of Potassium Oxide on the Viscosity of Melts of the System Lime-Alumina-Silica in the Range Corresponding to the Compositions of Primary Blast-Furnace Slags

and viscosities at 1300, 1350, 1400, 1450 and 1500 °C and the temperatures at the start of crystallization and at a viscosity value of 60 poise. Fig 1 shows lines of equal compositions for different values of viscosity, 16% Al_2O_3 and 1450 °C. Fig 2 shows isotherms for the start of crystallization for 16% Al_2O_3 slags. The viscosity and temperature of the start of crystallization are shown in Figs 3 and 4, respectively, as functions of the lime : silica ratio for various K_2O contents. The results show that the introduction of K_2O into the slags produces an increase in viscosity and crystallization temperature, the effect being most marked with slags having high lime : silica ratios. Addition of K_2O also reduces the range of the most fluid compositions, while the slag-viscosity minimum rises from 8 to 13 poise. The authors have estimated the mineralogical compositions of their slags (Table 2). Slags with minimal viscosity at 1450°C are characterized by the predominance of

Influence of Potassium Oxide on the Viscosity of Melts of the System Lime-Alumina-Silica in the Range Corresponding to the Compositions of Primary Blast-Furnace Slags

pseudo-wollastonite and gehlenite. With acid slag, increasing viscosity is due to formation of anorthite and free silica; with basic slags to formation of larnite.

Card 3/3 There are 4 figures, 2 tables and 9 references, 5 of which are Soviet and 4 English.

SUBMITTED: June 6, 1958

SOV/148-59-2-2/24

18(5)

AUTHOR: Rudneva, A.V., Engineer

TITLE: The Mineralogical Composition of Reduced Vanadium Slags With a High Phosphorus Content (Mineralogicheskiy sostav peredel'nykh vanadiyevykh shlakov s vysokim soderzhaniyem fosfora)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1959, Nr 2, pp 7-12 (USSR)

ABSTRACT: The following mineral phases were detected in slags, obtained by experimental blowing-through of vanadium-phosphorus iron: oxyphosphate knebelite; vanadium spinellide; ferrous rhodonite, and glass. Experimental analyses of these phases led to the following conclusions: The whole phosphorus content of the slag enters in the form of a complex PO_4^{3-} anion into the composition of the oxyphosphate knebelite, that is a solid solution of oxyphosphate in ortho-silicate. The crystallochemical nature of this compound explains the reverse relation of the silica and phosphorus content in reduced vanadium slags. A low silica amount in the slag and a correspondingly increased amount of phosphorus pentoxide, creates favorable conditions for a fuller separation of the spinellide phase containing the major

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The Mineralogical Composition of Reduced Vanadium Slags With a High Phosphorus Content

portion of vanadium. The chemical concentration of the slag increases the pentoxide vanadium content in the insoluble precipitate up to 25%.
There are 4 microphotos, 2 tables, 1 diagram, and 16 references, 10 of which are Soviet, 5 English and 1 German.

ASSOCIATION: Institut metallurgii imeni A.A.Baykova (Institute of Metallurgy imeni A.A. Baykov)

SUBMITTED: December 22, 1958

Card 2/2

RUDNEVA, A.V.

Phase constitution of niobium slags. Titan i ego splavy no.2: 41-49 '59. (MIRA 13:6)

1. Institut metallurgii AN SSSR.
(Niobium) (Phase rule and equilibrium)
(Slag--Analysis)

RUDNEVA, A.V.; MODEL', M.S.; MALYSHEVA, T.Ya.

Solid solutions in high titanium slags. Titan i ego splavy no.2:50-63 '59. (MIRA 13:6)

1. Institut metallurgii AN SSSR.
(Titanium) (Slag--Analysis) (Phase rule and equilibrium)

3 (8)
AUTHOR: Rudneva, A.V. SOV/20-125-1-40/67

TITLE: On the Composition and Conditions of Tagirovite Formation (O sostave i usloviyakh obrazovaniya tagirovita)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr. 1, pp 149-152 (USSR)

ABSTRACT: The author discovered a phase of solid solutions between the minerals of the ilmenite group TiO_3 in industrial highly titaniferous slags and designated them as tagirovite (in honor and in memoriam of the metallurgist Kirim Khasanovich Tagirov) (Ref 1). Table 1 gives its chemical composition and other data (Ref 2). The composition of tagirovite, however, is probably much more complex than had been assumed earlier (Ref 1) since it contains a constant amount of 6-7% aluminium oxide. In this case the Ti^{3+}-ions are isomorphically replaced by Al^{3+}-ions. The computation of the chemical composition of tagirovite (Table 2) according to its structure components has proved that the concept of its chemical nature was correct (Ref 1). An entirely precise agreement in the relation between the components and the formula obtained is found in those samples which contained the least impurities.

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M. S. Model' carried out an X-ray investigation of the pure phase (Table 3) and confirmed the structure which had been determined already earlier. On the basis of all results the following formula was obtained for tagirovite:

$$m\,[(Ti, Mg, Mn, Fe)\,O \cdot TiO_2] \cdot n\,[(Ti, Al)_2O_3]$$

A sample of the "pink-colored phase" (rozovaya faza) Nr 3353 also agrees well with the tagirovite formula (Ref 2). The precipitation of tagirovite from enamels in industrial slags depends on the TiO_2 content rather than on melting conditions. Additional data could be obtained from the phase transformations during the reduction of ilmenite concentrates (by V. I. Solov'yev). Parallel spindle-shaped bands and seams from another substance (Fig 1) are found in ilmenite grains which are reduced at 1000° and higher. They have optical properties of tagirovite. At 1150-1250° anosovite (Fig 2) is observed besides these new formations. It could be concluded from an X-ray investigation (by M.S. Model') that the new formations mentioned really have an ilmenite structure. Their optical differences from ilmenite are due to

an isomorphous content of titanium sesquioxide.
There are 2 figures, 3 tables, and 7 references, 7 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences, USSR)

PRESENTED: September 20, 1958, by I.P. Bardin, Academician

SUBMITTED: September 18, 1958

3(8), 5(1)
AUTHORS: Rudneva, A. V., Malysheva, T. Ya. SOV/20-125-2-35/64

TITLE: Opaque Rutile (Neprozrachnyy rutil)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol. 125, Nr 2, pp 363-365 (USSR)

ABSTRACT: The mineral phase called "opaque rutile" by the authors forms a solid solution of Ti_2O_3 in TiO_2, which can be mixed only to a certain extent. It is formed during the initial stages of the reduction of the tetravalent titanium oxide TiO_2. In publications no data are available on the optical characteristics of mixed crystals from $TiO_{1.90}$ - TiO_2. It is the purpose of the present paper to fill this gap. From an optical point of view, the crystals of the above-mentioned solid solution are completely opaque, whereby they differ particularly from rutile. In reflected light they show a distinct anisotropic effect and a reflecting power far beyond that of anosovite and crystalline Ti_2O_3 (16-20% as compared to 11-13% and 14%) (Figs 1, 2). The optical properties of opaque rutile with various contents of TiO_2 are described

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(Table 1). Neither the optical nor the radiographic characteristics indicate a two-phase composition of the slag in which opaque rutile within the boundary region of solid solutions with the Ti_6O_{11} phase was found. This is indicative of a very probable gradual transition of the crystal of opaque rutile into the Ti_6O_{11} phase with increasing Ti_2O_3 within the system TiO_2-Ti_2O_3 (in accordance with Ref 1). A survey of corresponding publications follows (Refs 1-8). It results from these data that the unbalanced crystallization of commercial slag occurring during the rapid reduction of titanium magnetite ores in solid and liquid state leads to the elimination of titanium oxides of the first two phases from the scheme of reduction (Ref 2). These are opaque rutile and the phase $Ti_6O_{11}(Ti_2O_3 \cdot 4TiO_2)$. In the papers mentioned in references 2 and 4 it was further determined that the principal phase of commercial slags, anosovite, attains the highest stability due to the presence of soluble impurities in anosovite. These are primarily the cations

Opaque Rutile

SOV/20-125-2-35/64

Mg^{+2}, Fe^{+3} and Mn^{+2} which stabilize its structure. There are 2 figures, 1 table, and 9 references, 5 of which are Soviet.

ASSOCIATION: Institut metallurgii im A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences, USSR)

PRESENTED: September 20, 1958, by I. P. Bardin, Academician

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FRAME I BOOK EXPLOITATION SOV/2439
SOV/2-8-58

Leningrad. Glavnaya geofizicheskaya observatoriya

Voprosy obshchey i klimaticheskoy klimatologii (Problems in General and Synoptic Climatology) Leningrad, Gidrometeoizdat, 1960. 141 p. (Series: Its: Trudy, vyp. 88) Errata slip inserted. 1,000 copies printed.

Additional Sponsoring Agency: USSR. Sovet Ministrov. Glavnoye upravleniye gidrometeorologicheskoy sluzhby.

Ed. (Title Page): O. A. Drozdov, Doctor of Geographical Sciences; Ed. (Inside book): T. V. Dobrova; Tech. Ed.: N. Ya. Flam.

PURPOSE: This publication is intended for meteorologists and synoptic climatologists.

COVERAGE: This issue of the Main Geophysical Observatory's Transactions contains 12 articles dealing with wind-caused redistribution of precipitation, ice accretion under various relief conditions, the characteristics of snow deposition, and forest shelter belts. The microclimatic peculiarities of a large city are analyzed. An evaluation of the velocity of moisture dispersion and transfer is attempted. Variability in the lower boundary of cloudiness and the possibility of smoothing temperature anomalies by taking into account the formation and intensity of circulation are discussed. The relationship between the variability of precipitation and the forms of atmospheric circulation is examined. The climatic conditions in individual regions of the USSR are described in three articles. No personalities are mentioned. References follow each article.

Table of Contents

AVAILABLE: Library of Congress

S/598/60/000/004/004/020
D215/D302

AUTHORS: Rudneva, A.V. and Malysheva, T.Ya.

TITLE: The compositions and modes of formation of new forms of solid solutions in high-titanate slags

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. No. 4. Moscow, 1960. Metallurgiya titana, 32-38

TEXT: A continuation of earlier work, in which the existence of solid solutions $mTi_2O_3 \cdot n[(Mg, Fe, Mn)O \cdot TiO_2]$ was established. A number of TiO_2-Ti_2O_3 slag compositions were examined microscopically. Between 2% and 15-20% Ti_2O_3 a single-phase structure was found, optically anisotropic, opaque (unlike rutile), but more reflecting than minerals of the anosovite group or crystalline Ti_2O_3. At 10-15% Ti_2O_3 the optical properties showed a considerable change in the appearance of marked color anisotropy, reduction of reflectivity to 16% from its value of 20% at 2% Ti_2O_3, and bi-reflection from pale violet to a greyish-blue color.

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The compositions ...

At 20% Ti_2O_3 the single-phase structure of the slag remained and the optical properties closely resembled those of Ti_6O_{11}; the reflectivity fell to 14.8%, and considerable divergence was found from the lattice spacings of rutile. At even higher Ti_2O_3 contents both optical and crystallographic examinations indicated the existence of the Ti_6O_{11} phase. No two-phase region was found by either method of examination; this suggested a gradual transition of "opaque rutile" crystals into Ti_6O_{11} with increasing Ti_2O_3 in the slag. Examination of slags of the TiO_2-Ti_2O_3-FeO system showed that even at small Ti_2O_3 contents both "opaque rutile" and anosovite were present, the quantity of the latter increasing with Ti_2O_3 and FeO contents. In the more complex slags containing magnesium, aluminum, and silicon oxides up to 10%, the phases were again found, the formation of anosovite being promoted by all ions

The compositions ...

except Ti^{4+}. In industrial slags formed by reducing high-titanate melts in the electric furnace, no solid solutions based on the rutile structure were found; anosovite and later a solid solution based on Ti_2O_3 being formed instead. Analysis of the latter revealed a fairly constant aluminum content (6-7%) and indicated a general formula of $(Ti, Al)_2O_3$ - $(Ti, Mg, Fe, Mn)O$. TiO_2. Formation of ilmenite (Ti_2O_3 - based) solid solutions was studied microscopically in specimens from the reduction of ilmenite concentrates. In the grains of ilmenite reduced at 1000°C or above, spindle-shaped laths of a substance differing optically from ilmenite were observed; recalling the ilmenite-based phase obtained by the authors from ferrous slags. Metallic iron was also found. On reduction at 1150-1250°C the Ti_2O_3 - based solid solution, anosovite, and unchanged ilmenite were found. The solid solution is thought to be isomorphous with ilmenite. It was assumed that the lower formation temperature of $m(FeO, TiO_2).nTi_2O_3$ than that of anosovite was connected with the smaller structural reorganization required in the first case;

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compared with the change from a hexagonal to a rhombic lattice in the second. Thus, in industrial reduction processes, minerals of the anosovite group formed initially, followed by a solid solution between ilmenite group minerals and Ti_2O_3 or $(Ti, Al)_2O_3$. This solid solution could also form in the solid state. There are 3 tables, 5 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

S/509/60/000/004/002/024
E111/E152

AUTHORS: Dmitrovskiy, Ye.B., Rudneva, A.V., and Karyazin, I.A.

TITLE: Study of the Systems TiO_2—SiO_2—FeO and TiO_2—CaO—FeO—Al_2O_3—SiO_2—MgO

PERIODICAL: Akademiya nauk SSSR. Institut metallurgii. Trudy, No.4, 1960. Metallurgiya, metallovedeniye, fiziko-khimicheskiye metody issledovaniya, pp. 35-45

TEXT: To obtain ternary fusion diagrams of titanium slags, viscosity vs. temperature curves were obtained in a viscometer in which the increase in current in a d.c. motor on inserting its shaft into the slag was measured. The slag was contained in graphite or pure-molybdenum crucibles; molybdenum vessels were inserted in the graphite to prevent its contact with ferruginous slag. For experiments on the six-component system under reducing conditions a Kryptol furnace was used, and a Tamman furnace with a pure-nitrogen atmosphere for both systems and to study the influence of lower titanium oxides on fusion. Temperatures up to 2060 °C were obtained, but were below 1700 °C in most experiments. In the ternary system the slags studied covered the range

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70-95% TiO_2, 1-15% SiO_2, 1-20% FeO. At 1500 °C most were solid; at 1600 °C and 1650 °C the viscosity of most was in the 2.5-3 poise range. The viscosity behaviour of these slags and particularly the high viscosity of titanium-rich slags is explicable in terms of components found by petrographic analysis. To study the influence of Ti_2O_3 on the fusion of the ternary system, 30-100% of TiO_2 was replaced by that oxide: the fusion temperature correspondingly rose from 1560 °C for the slag without Ti_2O_3 to 1690 °C for the highest Ti_2O_3 content. The six-component slag contained 70-83% TiO_2, 1-16% CaO, 1-12% FeO, 5% Al_2O_3, 4% SiO_2, 4% MgO. Under reducing conditions the upper limit of titanium-oxide content is limited to 80-82% and the fusion temperature is 1400-1650 °C. Under less reducing conditions the figures become 85-86% and 1350-1500 °C, respectively. In the ternary system an increase in SiO_2 above 10% leads to some increase in both fusion temperature and viscosity; an increase in FeO has the opposite effect.
There are 3 figures and 4 tables.

LEBEDEVA, S.I. (Moskva); RUDNEVA, A.V. (Moskva); KHLEBNIKOV, A.Ye.(Moskva)

Efficient technology of refining Kerch cast iron. Izv.AN SSSR. Otd.tekh.nauk.Met.i topl. no.4:85-94 Jl-Ag '60. (MIRA 13:9)
(Kerch--Iron ores) (Cast iron--Metallurgy)

RUDNEVA, A.V.

Relation between the extent of ice deposition on wires and the relief of the terrain. Trudy GGO no.88:25-29 '60.
(MIRA 13:8)
(Electric lines--Ice prevention)

S/137/62/000/003/046/191
A006/A101

AUTHORS: Gitgarts, D. A., Polyakov, A. Yu., Rudneva, A. V.

TITLE: Concentration of vanadium slags with high phosphorus content

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 22, abstract 3G144 (V sb. "Fiz.-khim. osnovy proiz-va stali", Moscow, AN SSSR, 1961, 271 - 276)

TEXT: The process of concentrating poor V-slags was studied in a laboratory. For this purpose a fine-crushed slag specimen was processed in a water bath for one hour with a HCl solution at 70 - 75°C, by stirring periodically. An amount of 5 - 10 ml gelatin was added to the solution, 5 - 10 minutes before removing it from the bath, to bring about coagulation of silica. The non-dissolved precipitate was then filtered off and boiled for 1 hour in a 10% soda solution, in order to bring SiO_2 into a soluble state. At silica contents exceeding 20%, the concentrates may contain $\leq$ 10 - 12% V_2O_3. Slags containing 14 - 18% SiO_2, make it possible to obtain concentrates with 10 - 15% V_2O_3 at a consumption of 2.5 - 3.0 g HCl per 1 ton of slag. Extraction of V is then 80 -85%. In such a manner, the chemical concentration method makes it possible to obtain V concentrates whose V content is prac-

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tically similar to that of V-slags used in the USSR, at sufficiently high values of V extraction into concentrates.

G. Svodtseva

[Abstracter's note: Complete translation]

RUDNEVA, A.V. (Moskva); KOZHEVNIKOV, I.Yu. (Moskva)

Phase constitution of open-hearth and synthetic phosphate slags. Izv. AN. SSSR. Otd. tekh. nauk. Met. i topl. no.3:10-16 My-Je '61. (MIRA 14:7)

(Slag--Testing)

DMITROVSKIY, Ye.B.; REZNICHENKO, V.A.; SOLOMAKHA, V.P.; Prinimali uchastiye: RUDNEVA, A.V., kand.geologo-mineralogicheskikh nauk; MODEL', M.S., kand.khimicheskikh nauk

Developing a flowsheet for the use of leucoxene-bearing ores. Titan i ego splavy no.5:13-16 '61. (MIRA 15:2)
(Titanium ores)
(Leucoxene)

DMITROVSKIY, Ye.B.; REZNICHENKO, V.A.; Prinimali uchastiye: RUDNEVA, A.V.; MALYSHEVA, T.Ya.

Metallurgical estimate of macrocrystalline titanium-magnetite ores. Titan i ego splavy no.5:20-27 '61. (MIRA 15:2)
(Titanium--Metallurgy)
(Magnetite--Metallurgy)

RUDNEVA, A.V.; ZHILO, N.L.; GUL'TYAY, I.I.; SOKOLOV, G.A.

Viscosity and the mineralogical composition of slags of the system K_2O - CaO - Al_2O_3 - SiO_2 with additions of MnO.
Trudy Inst. met. no.8:11-29 '61. (MIRA 14:10)
(Slag--Analysis)
(Phase rule and equilibrium)
(Viscosimetry)

SAMARIN, A.M.; RUDNEVA, A.V.; ZALESSKAYA, S.V.

Effect of the phase composition of slags on the process of cast iron gravitation in the reduction smelting of red pulp sinters. Izv.vys. ucheb.zav.; chern.met. 4 no.6:20-26 '61. (MIRA 14:6)

1. Institut metallurgii im. A.A.Baykova.
(Cast iron—Metallurgy) (Slag)

PANOV, A.S.; RUDNEVA, A.V.

Solubility of calcium sulfide in slags of the system CaO - SiO_2.
Izv. vys. ucheb. zav.; chern. met. 4 no.11:30-37 '61.
(MIRA 14:12)

1. Institut metallurgii AN SSSR.
(Slag)
(Calcium sulfide)

RUDNEVA, A.V.

The problem of efficient distribution of glazed frost stands in the U.S.S.R. Trudy GGO no.122:68-74 '61. (MIRA 14:8)
(Ice)

RUDNEVA, A.V.; MALYSHEVA, T.Ya.

The new slag minerals tseftosil and tselanit. Dokl.AN SSSR 136 no.1:191-194 Ja '61. (MIRA 14:5)

1. Institut metallurgii im. A.A.Baykova AN SSSR. Predstavleno akademikom N.V.Belovym.

(Slag) (Minerals)

S/020/61/141/006/020/021
B103/B147

AUTHORS: Rudneva, A. V., and Malysheva, T. Ya.

TITLE: Ceralite (tseralit), a new slag mineral of the perovskite group

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 6, 1961, 1423 - 1425

TEXT: In connection with studies of the authors on a variety of blast-furnace slag (Ref.1: DAN, 136, No.1 (1961) the composition of the oxide phase (very small accumulations) in slags of the system CaO - CeO_2 - CaF_2 - Al_2O_3 was examined. In the melting product of the mixture consisting of 60% of CaF_2, 21% of CeO_2, 12% of Al_2O_3, and 7% of CaO, an artificial mineral was found and named ceralite, in which CeO_2 and Al_2O_3 predominate. The mixture was melted in a graphite crucible in the Tammann furnace at 1520°C. Slags with maximum crystals were obtained by gradual

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Ceralite (tseralit), a new slag mineral...

cooling with rates of 3°C/min from 1520 to 1460°C and of 1.5°C/min from 1460 to 1274°C. The resulting slag consisted of two mineral phases: ceralite and fluorspar, which were cemented by glass. Ceralite forms idiomorphic crystals with facets of a cube or more rarely of a pentagon dodecahedron of different, often speckled coloring from almost colorless to intense emerald green. The emerald green spots usually follow the cracks or the periphery of the crystals. The occurrence of the green coloring cannot be explained. The ceralite crystals are optically anisotropic (similar to all perovskite minerals) and show a complex polysynthetic twinning. The refractive index $n' \sim 2.09$ ($2.06 < n' < 2.11$ was determined in sulfur-selen melts). Fluorspar and ceralite crystals were separated from the crushed slag. The cementing glass was dissolved by boiling in dilute HCl (1 : 10). Fluorspar, as the lighter mineral, was separated from ceralite by centrifuging in Clarich (Klerich) solution (specific weight 4.2). The analysis (made by V. Ya. Shevtsova) shows a ratio of the components corresponding almost exactly to the formula $A^{\cdot}B^{\cdot}O_3$ and indicating thus a perovskite structure. The interplanar spacings of ceralite measured by M. S. Model' prove a great structural

Ceralite (tseralit), a new slag mineral... S/020/61/141/006/020/021
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similarity to celanite (tselanit) (Ref.1) and perovskite, which is also confirmed by a comparison of the Debye powder patterns. It results from the formula of ceralite $(Ca^{2+}, Ce^{4+})\ Al^{3+}(O^{2-}, F^{1-})_3$ that it is, like celanite, an example of heterovalent isomorphism. The similarity of the two new minerals ceralite and celanite to other natural perovskite minerals as to both the type of the chemical compound and the crystalline structure is explained by the likeness of the radii of cations and anions which are parts of the isomorphous groups A, B, and X respectively. The absence of titanium in the perovskite compounds of the type $NaNbO_3$, $BiFeO_3$, $BaSnO_3$, $PbZrO_3$, etc. and in ceralite compounds is one of the most important differences between the above artificial minerals and the natural perovskite minerals in which Ti is an obligatory and quantitatively predominant component. A. G. Betekhtin is mentioned. Ref.2: Mineralogiya (mineralogy), M., 1950. There are 2 figures, 2 tables, and 6 references; 3 Soviet and 3 non-Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of

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Ceralite (tseralit), a new slag mineral... S/020/61/141/006/020/021
B103/B147

Sciences USSR)

PRESENTED: July 21, 1961, by N. V. Belov, Academician

SUBMITTED: April 20, 1961

Card 4/4

RUDNEVA, A.V.; PANOV, A.S.

Effect of calcium sulfide on the phase composition of slags of the system CaO - MgO - SiO_2. Izv.AN SSSR Otd.khim.nauk no.4: 553-557 Ap '62. (MIRA 15:4)

1. Institut metallurgii AN SSSR.
(Slag) (Calcium sulfide) (Systems (Chemistry))